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Integrated planning and management of land resources

Report of the Secretary-General

Addendum

Combating desertification and drought*

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I. Introduction

1. The present report reviews progress in the implementation of chapter 12 of Agenda 21, on combating desertification and drought, in the context of integrated land resource planning and management. It also reviews the implications of the implementation of the United Nations Convention to Combat Desertification in Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa for the integrated planning and management of land resources in the affected countries. It is submitted to the Commission on Sustainable Development as an addendum to the report of the Secretary-General on integrated planning and management of land resources.

2. Desertification and drought remain crucial issues for the sustainability of land use, having economic and social consequences and causing environmental degradation. The problems are worldwide, with more than 100 countries affected, but they are particularly evident in the poorest regions of the developing countries, especially in Africa.[1] At least one quarter of the total land area of the world, or 3.6 billion hectares, is affected by desertification. Recent estimates suggest that almost 1.6 billion people live in arid and semi-arid countries and that nearly half of the world's poor people live in dryland regions with fragile soils and irregular rainfall.[2]

3. The present report focuses on major trends and developments in achieving the objectives of the Convention to Combat Desertification with regard to the sustainable management of drylands. More detailed information on progress in the implementation of the Convention was reported to the Conference of the Parties at its third session (Recife, Brazil, 15-26 November 1999) and is available on the Convention web site (www.unccd.de/). The report will address the following issues in particular:

(a) Improving knowledge, understanding and assessment of land resources, present land use and land degradation;

(b) Developments and trends in integrated land resource planning and management in drylands;

(c) Emerging challenges and priorities for sustainable land resource management.

II. Improving knowledge, understanding and assessment of land resources, present land use and land degradation

4. Understanding the natural, social, cultural, economic and political features of local and national environments, particularly their dynamics and interactions, is considered as one of the basic principles of the Convention to Combat Desertification. Improvement of the knowledge base is widely considered a necessary first step for addressing the relevant problems and developing appropriate responses. Many research and data-collection activities are being implemented worldwide better to understand the state of the natural resources in dryland areas. The following examples can be mentioned:

(a) A water resources inventory and global information system (GIS) mapping for Africa is currently being carried out by FAO, using the river basin and watershed spatial units;

(b) Land resource and land degradation surveys have been carried out in sub-Saharan Africa (e.g., Burkina Faso) and Latin America (e.g., Brazil) and will provide an important basis for planning and strategies for implementing the Convention;

(c) Land cover and land-use inventories and analysis are being undertaken in several regions (e.g., global change and subsistence rangelands in southern Africa) as part of the Land-Use and Land-Cover Change (LUCC) initiative;[3]

(d) Biodiversity inventories in dryland regions are planned as a collaborative programme between the secretariats of the two Conventions on Biodiversity and the Convention to Combat Desertification.[4]

5. The knowledge base has been broadened in sectoral issues relevant to desertification and drought at national, regional and global levels. Worldwide expanding use of information technology and decision-support tools (e.g., GIS, remote-sensing and Internet) has facilitated the development of functional systems to collect, process and disseminate data on different issues. There has also been a growing effort to develop integrated information systems on desertification allowing:

(a) Data and information to be processed and analysed in a more integrated and dynamic way;

(b) Different data to be linked and compiled in a harmonized and flexible framework so as to improve dialogue across sectors (such as various national and regional networks and thematic networks on desertification, conducted, for example, by China, India, Iran (Islamic Republic of), Italy, and Latin America);

(c) Local data to be integrated into national or global information systems and networks, such as the World Overview of Conservation Approaches and Technologies (WOCAT).[5] This global database is progressively improved by a range of partners worldwide, providing data and assessments on local conservation approaches and technologies.

6. Progress has been made in better assessing the interactions between physical, ecological, social, economic and policy aspects of the desertification process. In particular, the linkages between land degradation, vegetation cover, carbon sinks, biodiversity and drought have been addressed at various levels.[6] This has provided a good basis for better synergies between the legal and policy instruments related to the United Nations Framework Convention on Climate Change, the Convention on Biological Diversity, the Ramsar Convention on Wetlands, and the statement of Forests Principles of Agenda 21, and for better optimizing the synergies at national and local levels.

7. The dissemination of data and information, know-how and proven technologies and experiences has been boosted by the increasing use of Internet-based networks and CD-ROMs. For example, FAO produced and distributed a CD-ROM on desertification compiling relevant bibliographic data. An increasing number of web sites and Internet databases have been developed on the subject of desertification by a large number of concerned organizations. Through links and clearing-house

mechanisms (e.g., FAO/Italy)[7] the access to this extensive information is facilitated. An inventory of drought preparedness strategies in Africa is under way with support from UNDP's office to combat desertification and drought (UNSO) and USAID. The World Agricultural Information Centre (WAICENT), developed by FAO, provides on the Internet data and statistics on agriculture and land use through a collaborative partnership with data custodian institutions in the concerned countries.

8. In response to the request of the Conference of the Parties of the Convention to Combat Desertification at its first session, a consortium of 15 agencies and organizations, both inside and outside the United Nations system, and coordinated by UNEP, developed an interactive Web-based meta-database on networks, institutions, agencies and bodies relevant to implementation of the Convention for the Committee on Science and Technology (CST) of the Convention. The database will have links to national action programmes and traditional knowledge on desertification control. The philosophy and approach to land and environmental information systems is leading towards decentralized structure and functioning, where national and international coordination units are established with the role of creating links between data custodians, harmonize and integrate data of various nature and format, and facilitate access to the information by users and decision makers.

III. Developments and trends in integrated land resource planning and management in drylands

A. Advances in addressing the socio-economic dimensions of land-use management in drylands

9. Research institutions, development organizations and non-governmental organizations have increasingly addressed traditional farming systems and socio-economic dynamics of indigenous societies as a key element of sustainability. For example, the International Centre for Agricultural Research in Dry Areas (ICARDA), a CGIAR centre located in the Syrian Arab Republic, is investigating, through case studies, the socio-economic factors that determine how resources are accessed and managed by communities of resource-users (e.g., property rights and common-property management), with particular emphasis on social, cultural and economic constraints operating beyond the farm boundaries and on estimation of economic and social costs of land degradation. Applied research has been active in identifying indicators modelling land management scenarios. The role and influence of local knowledge on land management has been particularly enhanced by the promotion of a decentralized and participatory approach, and it was reiterated as a top priority issue by the Committee on Science and Technology at the third session of the Conference of the Parties (November 1999).

10. The preparation of the national and regional action plans relating to the Convention provides an opportunity in many countries to apply the concept of the participatory approach in the early planning stages. The participatory approach integrates the technical perspectives of land users with their socio-economic concerns, such as food security, poverty alleviation, income opportunities and cultural values. In most countries the process of building a national action plan is initiated from an enlarged consultation at the national, subnational and local levels.

Stakeholder participation facilitates assessment, the identification of priorities, establishment of responsibilities and institutionalization of platforms for dialogue and negotiation. UNSO reported that in Burkina Faso, 30 provincial and 10 regional committees were set up to facilitate consultation at the local level. Civil society members, including religious leaders, were positively involved in the preparation of a national action plan in Senegal. In Cape Verde and Botswana the consultation exercise was driven by a decentralization demand by local actors and contributed to building up planning capacity at the local level. Eritrea, Kenya, Lesotho, Malawi, Sudan, Swaziland, the United Republic of Tanzania, Uganda and Zimbabwe are participating in a pilot programme to support local initiatives, aimed at promoting access to small-grant resources to address their priorities and help communities take responsibility for the programming and monitoring of resources.

11. As has been estimated, nearly half of the world's poor people live in dryland areas. But drylands may be seen as potential areas for agricultural intensification if water resources can be mobilized. The Special Programme for Food Security (SPFS), one of the FAO priority programmes since the World Food Summit in 1996, is encouraging a number of strategic activities of direct relevance to the Convention, such as water control and water-use efficiency, farming diversification and sustainable agricultural practices. To make investment in their land a viable option for farmers and other land users, supportive policies and accompanying measures are made available. These include infrastructure, post-harvest storage, processing and distribution facilities able to guarantee food production and supply as well as employment, and access to markets and income. In addition to national food self-sufficiency, regional integration and complementarity are encouraged in order to develop more effective ways to mobilize domestic resources and to attract private investments in and outside dryland areas.

12. The cultural and social links between population and landscape (spatial unit) have often been underestimated. The mobility of pastoral communities has often been seen as a major cause of degradation of marginal grazing lands, and its practice has not been promoted. It has even been banned in some regions. Seasonal movement of livestock in North Africa, central Asia and the Middle East, for example, is a traditional practice that regulates pressure on rangeland according to climatic variations and seasonal growth and allows exchanges and trade between regions with different agro-climatic conditions and favourable economic and social complementarity. The creation of resource user groups, as shown in the case study described in box 1, can increase awareness on the sustainable use of resources.

Box 1
"Social fencing" in rangeland rehabilitation in Pakistan*

Rangelands cover 93 per cent of the Balochistan province, and local communities own 90 per cent of the land. Rangeland degradation is severe, particularly in nearby villages, overgrazing being the major cause. In these arid conditions nomadic pastoralism developed over centuries.

Through a participatory rural appraisal, the villagers were made aware that the degradation problems could be overcome by restoring mixed vegetation and protecting some areas for at least three years. The establishment of village associations in the target area was instrumental for the elaboration and acceptance of "village upland use plans". The associations decided which areas to protect and which enforcement measures to be adopted, as well as the rotation schedule. An approach called "social fencing" was a key factor for ensuring respect for the agreed rules during the start-up phase. The visible effects of biomass regeneration, the planting of locally appreciated and multifunctional indigenous plant species, and the effectiveness of simple and low-cost water-harvesting techniques were all key factors.

* See FAO, "Rangeland rehabilitation in Balochistan: the experience of the Kanak Valley" (Italy, 1997).

B. Promoting sustainable land resource management techniques and practices

13. Increasing experience is gained through community-based resource management projects (*gestion des terroirs*, in French), as described in box 2. The management of common property resources, such as forests, water and grazing land, is a key issue for enhancing social cohesion and avoiding conflicts of interests. Several approaches have been used — for example, legalizing tenure and resource uses by formalizing the ownership of common property and land use rights, in accordance with the opportunities offered by the national legislation; environmental awareness; development of partnerships among communities and conservation institutions; and providing incentives for sustainable common resources management practices.

Box 2
Gestion des terroirs* in dryland Sahel: a social insight into community land use

Community-based resources management projects have been implemented in Niger, Mauritania, Mali and other West African countries by the United Nations Capital Development Fund (UNCDF) and FAO.

By mobilizing community leaders and representatives of different groups, the projects gained knowledge of the socio-spatial dimensions of the environment, creating a platform for dialogue in which the land resource uses and management mechanisms are discussed, planned and approved by the community itself. A key stage in the negotiation is the transition from a long-term sustainable strategy to the preparation of a short-term plan that addresses immediate social and economic concerns.

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* See United Nations Capital Development Fund, "Eco-development". UNCDF policy series, 1997.

14. Emphasis is being placed on traditional knowledge and good practices where these are shown to favour resource conservation and consolidate socio-economic cohesion. This principle has been the driving force behind the creation of information and decision-support systems such as WOCAT and the UNEP initiative on success stories in land degradation/desertification control. This approach is also applied in projects such as the joint UNU/UNEP/GEF programme called People, Land Management and Environmental Change (PLEC), which is carrying out joint farmer/researcher inventories and demonstrations of local management practices in critical areas from the farmer's perspective. The programme stimulates the local stakeholders to establish sound relationships with extension and research workers, policy makers and planners. There is growing awareness that traditional farming systems cannot be separated from the roles of the different groups (e.g., women, elders, religious and political leaders) in the local decision-making system. Responsibilities are linked to empowerment. Case studies have shown that working in land units that combine agro-ecological zoning (i.e., watersheds) with administrative or community boundaries facilitates the recognition or establishment of strong relationships between land resources and land uses.

15. From FAO's project experiences it appears that traditional good practices are supported when farmers have a perception of their problems.[8] Environmental awareness and management skills can be improved only if a certain level of organizational capacity is reached and if primary needs (food security, land security, income, water supply, education, communication services etc.) are first satisfied to a reasonable extent. This enabling environment is a precondition if the farmers (and for stakeholders at large) are to play an active part in the planning and decision-making process. Box 3 gives an example of institutional innovation that seems to have facilitated sustainable development processes and more efficient farming practices.

Box 3
The landcare approach

The core of the "Landcare" model which was developed in Australia is effective local community groups in partnership with local government. Essential elements of the approach are:

(a) A flexible set of proven technologies for small-holder agro-forestry and conservation farming;

(b) Farmer exposure to these technologies through on-farm observation and trial;

(c) Development of a farmers' organization to diffuse widely successful knowledge about the technologies within the municipality;

(d) Financial support from local government (municipal and village) to enhance the sustainability of the movement.

The International Centre for Research in Agroforestry (ICRAF), a CGIAR centre based in Nairobi, is testing the Landcare experience in Indonesia, the Philippines and Thailand, by developing a knowledge base for action at the field, community, and watershed levels, using practical conservation farming and agro-forestry practices (focusing on technical innovations that promise more sustainable upland agricultural systems on the farm); experiences of farmer-led organizations for solving sustainable agriculture and natural resource management problems; and processes of natural resource management devolution from the national to the local government level, all based on field research in key watersheds.

Experiences from its wide adoption in Australia (where it now consists of some 4,600 grass-roots community groups and the supporting institutional apparatus) and in other countries suggests that the Landcare approach, as an institutional innovation for conservation farming in the tropics, may provide a way to share technical information much more efficiently, spread the adoption of new practices, enhance research and foster farm and watershed planning processes. Conservation farming provides a sound basis on which farmers can organize their own associations to seek practical ways of overcoming their problems. The diffusion of such technologies has been greatly enhanced by the evolution of local Landcare groups.

16. The replacement of damaging practices with innovative solutions that can cope with local social and ecological peculiarities and are simple to adopt and self-sustainable is behind the development and promotion of land management techniques encompassed in the concept of conservation agriculture. The objective of conservation agriculture is to promote production systems able to satisfy stable production, economic viability and effective conservation and optimum use of water, soil and agro-biodiversity components. It is based on the adoption of sustainable land-use practices by farmers and rural communities and their capacity to mitigate the land degradation factors. Conservation agriculture involves very

diverse site-specific applications and therefore cannot be a standardized technology package. It is a methodological approach aimed at developing farmer-driven solutions for specific problems, enhancing the resilience of farming systems and optimizing the natural interactions and synergies of land resources, such as soil, micro-organisms, water, agro-biodiversity and crop rotations.

17. The ouputs and the lessons learned from the application of conservation agriculture are potentially very useful, influencing policy-making and emphasizing the goal of sustainable agriculture. Although examples of successful conservation agriculture in intensive and mechanized farming are well recorded in some countries, such as Brazil and Australia, applications in lower-input systems in dryland conditions are still limited in many countries. However, traditional practices and the preliminary results of conservation agriculture have been assessed and promoted by programmes such as WOCAT. That initiative, launched in 1992 by a consortium of international institutions, has been further developed with additional successful case studies and is now available on CD-ROM and soon on the Internet.

18. The support of private sector technology and services, the establishment of a policy enabling environment and the visibility of social and economic benefits for farmers are important for the dissemination of sustainable practices. More recently, conservation agriculture opportunities have been developed and tested in small-holder conditions using the community or the watershed as the referential units. Sustained support to field activities, dissemination of the results and integration of the approach in training and extension messages should be at the top of the agenda. In addition, the driving forces behind the development of conservation agriculture must be duly considered; they include economic policies (subsidies and incentives, input supply and prices), training and extension services, and land tenure regimes.

19. National and local capacity-building is widely considered to be an essential condition for promoting an integrated approach to land planning and management. To translate the participatory approach into effective empowerment and self-reliance of local actors, particular emphasis has been given in the training of administrators, practitioners and local partners to planning and managing programmes such as national action plans and drought preparedness. The objectives are to decentralize skills, increase awareness, harmonize national and local strategies and match planned activities with local conditions. On the other hand, the promotion of good practices and innovative solutions and their adoption in the field need the full involvement of farmers and practitioners as well as of the people involved in research and extension. Several training approaches have been developed and applied at various levels. "Farmers field schools" (e.g., in Cuba) are promoting improved collaboration between farmers and researchers and, through that synergy, developing viable *in situ* demonstrations. "Farmer-to-farmer" programmes promote the role of farmers as extensionists building on successful farmer-driven practices. The "farmer innovators" approach stresses the capacity of farmers to adapt their farming systems to innovative techniques and to the changing requirements and the role of farmer as catalysts in the transfer of appropriate technology. These methodologies differ in name rather than in approach. They all show positive results in terms of:

(a) Integrating local knowledge and innovative technology;

(b) Adoption or improvement of sustainable land use practices by farmers;

(c) Improved relations and collaboration between research, land users and extension services;

(d) Cost-effectiveness and reduced dependence on external know-how and inputs.

20. Water resource limitation, both in quantity and quality, is intrinsically related to drylands. Most dryland societies are strongly dependent on agriculture, despite the risks involved. Drought mitigation and prevention strategies aim at helping people "learning to live with drought".[9] The launching of decentralized drought preparedness and mitigation programmes contributes to the capacity of local communities to plan, develop and manage their own desertification and drought responses and strengthens their responsibility for the management of their land and water resources. This requires programmes tailored to local agro-climatic conditions and to the local social and economic factors, since they determine the type of agricultural development that is most relevant. A watershed and catchment approach is progressively adopted. The water-use strategies and technologies differ according to the prevailing local skills and socio-economic conditions and to the required investments. In Israel, for example, efficient water distribution methods make it possible to irrigate arid soils.

21. The use of drip irrigation has been shown to minimize losses and lower the salinity in the root zone. Brackish water can be used for salt-tolerant species, and organic material from urban and agricultural waste is also used as compost to rehabilitate saline soils. It is clear that these practices are heavily dependent on research and investments and may not all be applicable in poor dryland countries. However, there are basic concepts of land and water management that may well serve for site-specific (but transferable) solutions. The following can be mentioned:

(a) Optimization of available water by improving distribution and minimizing losses by, for example, increased water harvesting and storage, piped supply and localized irrigation;

(b) Recycling waste water from urban and livestock farming sources, after ensuring that its quality is suitable for crops and human health;

(c) Increasing the water retention capacity of the soil by applying, for example, mulching, soil cover and shading;

(d) Selecting and developing drought- and salt-tolerant crops, a practice that is linked to biotechnology, promotion of indigenous species and agro-biodiversity.

C. Comprehensive and integrated policies and planning processes

22. The ratification of the Convention to Combat Desertification by 159 countries is a binding commitment to combat desertification and related degradation problems and to integrate its initiatives into broader development policies and mechanisms. International agencies, including the International Fund for Agricultural Development (IFAD), UNSO, UNEP, FAO, the World Bank, the United Nations Educational, Scientific and Cultural Organization (UNESCO) and the World Meteorological Organization (WMO), play a key role in assisting countries to prepare their national action plans and to implement Conference-related activities. In most signatory countries, the process of elaborating national, regional and/or

subregional action plans is under way with variable results and progress. In Burkina Faso, Mali, Senegal, Togo and Uganda the national action plan has been completed and placed under the coordination of a national environmental action plan secretariat. The action plan itself constitutes the umbrella strategy for other specific land-related plans and programmes, such as the Soil Fertility Initiative. In Zimbabwe the district environmental action plans provide the framework into which the national action plan has been integrated. In Botswana and Ethiopia, national conservation strategies provide the framework for the national action plan. Due to the early stage of the national action plan building process, it is difficult to assess the short-term benefits realized at the regional, national, subnational levels and their concordance with longer term environmental and socio-economic objectives. Results to date are more visible in the advancement of the plan processes than in actual control of desertification. In resolution 54/223 the General Assembly invited affected developing countries that had not yet adopted their national action programmes or, where appropriate, regional or subregional action programmes, to try to finalize them no later than the end of 2000.

23. On a global scale, there is growing recognition of synergies. The secretariat of the Conference to Combat Desertification has signed memoranda of understanding with the secretariats of the Convention on Biological Diversity and of the Ramsar Convention on Wetlands. Consultations are also under way with the Framework Convention on Climate Change. The secretariat of the Conference to Combat Desertification has also developed or is in the process of developing memoranda of understanding with other institutional partners, such as FAO, UNESCO, the United Nations Development Programme (UNDP), UNEP, IFAD and GEF.

24. There is growing diversification as regards the establishment of financing mechanisms to fund plans and initiatives related to the Convention to Combat Desertification. For example, the use of debt-for-environment swaps for national desertification funds is being considered by several countries and by bilateral and multilateral donors. However, the problems of access to financial resources still remains a major constraint for rural dwellers. According to FAO sources, national desertification funds are being designed or established in 22 countries as small grants and loans schemes accessible to communities, non-governmental organizations and local actors. These instruments can provide a major boost to the adoption of the participatory approach and can empower local communities to advance their own initiatives without waiting for governmental or donor budget approval. Financing opportunities for small-scale entrepreneurs are being considered by several funding and development agencies, such as UNDP and the African Development Bank. Since 1998, GEF support to land degradation and desertification activities has grown as the linkages between land degradation, deforestation and the GEF focal areas[10] have been better defined and analysed. Also, the nature and functions of the Convention's global mechanism as a broker for projects at the small-holder level are being developed.

25. The Convention principle of developing partnerships and cooperation on land resource management, in order to optimize the human resources available and minimize the risk of conflicts over land-use options, has been a driving force at various levels in the process of building national action plans and in the implementation of Convention-related activities. At the policy level, the dialogue between international agencies and financing institutions has been enhanced by developing agreed or complementary strategies, identifying common priorities (i.e.,

inclusion of land degradation issues in GEF focal areas), harmonizing financing procedures and establishing consultative mechanisms and networks for exchange and dissemination. At the research level, an increasing number of partnerships have been established between international research organizations and research and development institutions in the Convention countries, such as the national agriculture research systems. However, human resources and technical and financial means are often a limiting factor in these efforts. The participatory approach applied to the management of common property resources provides a comprehensive ground for partnership-building at the community level. The crucial involvement of civil society in the preparation of national action plans has raised the need for mutual support at the national and international levels, leading to the creation of a global non-governmental organization network, Réseau international des ONG sur la désertification (RIOD).

IV. Challenges and priorities for comprehensive and sustainable land resource management

A. Developing a comprehensive framework

26. One of the main challenges of sustainable land management in drylands is to identify reliable indicators on desertification status and trends in order to assess the extent of the problem, forecast the evolution and monitor the impact of the various responses. Within the physical parameters, soil and terrain degradation or loss is the most reliable and measurable criterion of desertification. Vegetation coverage, density of species, soil fertility, erosion and salinization are among the most commonly used parameters, but their change may be also due to climatic cycles. The focus is currently more directly on socio-economic issues. Although socio-economic indicators, such as migration, income levels and conflict, may not be uniquely related to desertification, they may serve as early warning signals that desertification processes are beginning and may provide a useful monitoring framework for assessing the impact of related actions.

27. There have been growing demands from Convention signatory countries for standardized and reliable assessment methodologies and tools to be used in the national/regional action plan implementation process and to serve as reference systems for planning, managing and monitoring Convention-related activities. Although there is general agreement on the use of methods such as remote-sensing, soil maps and surveys, climatic data, socio-economic statistics, GIS and ground-checking, the parties have not reached a consensus so far on global methodology, scale or a common set of integrated indicators. During the third session of the Conference of the Parties, there was a general call for integrating energy, water management and forestry-related issues into a comprehensive assessment framework on land degradation. Special priority was given to the development of early warning systems and to an enhanced role for traditional knowledge and indigenous people in the decision-making process.

B. Focusing on "hot spots" of land degradation and critical interfaces among land uses

28. Drylands are, by definition, critical land systems. The effects of desertification and drought are even more acute as pressures on land resources increase. The pressures can become manifest in various ways and eventually turn into conflicts of interest between different users. Examples of critical land systems particularly relevant in dryland areas are described below.

1. Desert margins

29. Initiatives for controlling sand encroachment and desert expansion have been carried out in many drylands in the African Sahel by promoting agro-forestry, managing grazing land and mobility of herds, increasing water-storage capacity and maintaining the economic and social functions of oasis ecosystems. More emphasis is currently placed on improving traditional land management systems that are based on the capacity of local agro-biodiversity to respond and adapt to these extreme conditions.

2. Mountain environments

30. In drylands, mountains are often the main source of water for downstream areas. Any land-use changes in the headwaters of rivers is of paramount importance for lowland irrigation and other water uses. The conservation of land and water resources in mountain areas is being carried out in several regions (e.g., the Guinea highlands at the sources of the Niger River, the Himalayas at the sources of the Indus and Ganges rivers) by improving farming systems and reducing the rate of deforestation. More information on this topic can be found in the report of the Secretary-General on sustainable mountain development (E/CN.17/2000/6/Add.3).

3. Inland waters, groundwater reserves and wetlands

31. Lakes and groundwater reserves are a strategic source of water and development opportunities. Inland wetlands constitute an important land and water interface capable of mitigating the effects of hydro-climatic variations. However, fragile wetlands have been reclaimed for agriculture or urban development in several countries, and water resources have been overexploited for irrigation purposes. The Aral Sea in central Asia, which has been reduced to one fifth of its previous volume, is one of the worst environmental disasters in recent years and has become of global concern because of the resulting human health hazards and destruction of nature.

4. River basins and watersheds

32. It is widely held that integrated approaches to macro- and micro-ecosystems facilitate an equitable sharing of water resources. This is particularly relevant for international water basins. An integrated approach also favours the monitoring and control of upstream/downstream interactions and the development of land-use options that combine resource conservation and increasing productivity.

5. Coastal areas

33. The pressures of population growth and rural migration on land and water resources are particularly acute in coastal areas. Natural ecosystems — for example, wetlands, estuaries and deltas, mangroves and dunes — face competition from multiple land and water uses, such as urban and industrial development, farming, aquaculture and tourism. This land/sea interface has been addressed in many regions, including drylands. Integrated Coastal Area/Zone Management (ICAM or ICZM) approaches have been applied at various scales and can respond to different development objectives while taking into consideration the other issues at stake. The Global Programme of Action for the Protection of the Marine Environment from Land-based Activities (GPA), which was adopted in 1995, has as its main objectives identification of the various land-based sources of pollution (including nutrients and sediments) and prevention of the degradation of the marine environment. A clearing-house mechanism is being developed by the UNEP/GPA secretariat.

6. Forests

34. Tree resources are usually scarce in drylands, and they are threatened by demands for timber products, fuelwood for households, shelter and food for animals and agro-forestry. To reduce the pressure on forests and tree resources, alternatives to unsustainable practices must be developed (e.g., non-wood energy sources, improved stoves in households). The multiple functions of forest resources must also be promoted and supported through resource conservation for the benefits they offer to farming as well as to other social and economic interests in local communities and the concerned countries. (See E/CN.17/2000/6/Add.1, on combating deforestation). The special needs and requirements of developing countries with low forest cover and unique types of forest are receiving more emphasis, especially by the Intergovernmental Forum on Forests (IFF) of the Commission.

C. Meeting the challenges of increasing pressures and competing demands on land resources

35. The major challenge in addressing critical land systems is to create an integrated framework of technical, social, economic and policy mechanisms that enable the decision makers and the stakeholders to anticipate and respond to the increasing pressure. This enabling environment should take into particular consideration the following factors:

(a) Land tenure and land security: stabilizing land ownership and use rights (including common resources) is a precondition for promoting among farmers and rural communities the concept of land as a renewable and dynamic resource;

(b) Economic long-term viability must be guaranteed for land users. Supportive trade, financial and fiscal policies must accompany the promotion of good practices. Farmers will not envisage investment in better land husbandry unless the resulting benefits will be fully appreciated and internalized;

(c) Visibility of benefits must be emphasized in the promotion of good practices. This includes socio-economic benefits, such as increased incomes,

equitable sharing, improved livelihood and community and family cohesion, as well as environmental benefits;

(d) Empowerment and participation of stakeholders, whose roles and responsibilities must be clearly defined, in particular for common resource management and wherever interactions with other land users and actors are instrumental for the sustainability of the whole land system — for example, upstream/downstream relationships and production and marketing agreements;

(e) Complementarity between national policies and local initiatives (subsidiarity): creating platforms for dialogue and decentralized consultation mechanisms would facilitate the harmonization and integration between national strategies and action plans and local responses. Policies as well as legislation should enhance complementarity in the decision-making process and in the establishment of sound responsibilities and roles.

Notes

[1] The global nature of the problem is evidenced by the fact that an additional regional implementation annex to the Convention for the countries of Eastern and Central Europe is currently being drafted.

[2] Mahendra Shah and Maurice Strong, *Food in the 21st Century: From Science to Sustainable Agriculture* (Consultative Group on International Agricultural Research, 1999), pp. 63-64.

[3] LUCC is a joint initiative of the International Geosphere-Biosphere Programme (IGBP) and the International Human Dimensions Programme on Global Environmental Change (IHDP). This multidisciplinary initiative has three main focal areas: land-use dynamics, land-cover changes and regional and global models.

[4] See, for example, United Nations Environment Programme, *Biological Diversity of Dryland, Mediterranean, Arid, Semi-Arid, Grassland and Savannah Ecosystems: Options for the Development of a Programme of Work* (Nairobi, 1999).

[5] WOCAT, a part of FAO's Land and Water Digital Media Series, is implemented by a pool of international and national research and development agencies.

[6] See, for example, the report of the third Conference of the Parties (ICCD/COP(3)/20 and Add.1).

[7] FAO and Italy have jointly developed an Internet-based access to information and data relevant to desertification. See *www.fao.org/desertification*.

[8] For example, Indigenous Soil and Water Conservation in Africa, a FAO project currently implemented in Burkina Faso, Cameroon, Ethiopia, Tanzania, Tunisia, Uganda and Zimbabwe and funded by the Government of the Netherlands.

[9] FAO, Sub-Regional Office for Southern and Eastern Africa, *Drought Impact Mitigation and Prevention — A Long Term Perspective* (Rome, 1999).

[10] GEF focal areas are climate change, biodiversity, ozone protection, and international waters.

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Integrated planning and management of land resources

Report of the Secretary-General

Addendum

Sustainable mountain development*

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I. Introduction

1. Mountain ecosystems contain an integrated complex of natural resources that are closely linked in space and time. Those who inhabit the mountains generally depend directly on many of these resources for their livelihoods and tend to utilize and manage them through a combination of land-use practices such as agriculture, forestry and livestock production. With these characteristics, sustainable mountain development is directly linked to "integrated planning and management of land resources", the sectoral theme for the current session of the Commission. The present report was prepared within this context and describes progress made in the implementation of chapter 13 of Agenda 21 (Managing fragile ecosystems: sustainable mountain development) since the most recent report on the chapter was issued in 1997 (E/CN.17/1997/2/Add.12).

2. At an institutional level, the way in which chapter 13 has been organized and the mechanisms that have developed over recent years to promote collaboration and cooperation in achieving its objectives have been an important means of bringing together a variety of sectoral concerns and approaches, as well as different types of institutions, including non-governmental organizations, Governments and intergovernmental organizations. Improved cross-sectoral cooperation and interinstitutional collaboration have resulted in many initiatives that address both conservation and development concerns.

II. Progress on major themes

3. Chapter 13 contains two programme areas for action:

(a) Generating and strengthening knowledge about the ecology and sustainable development of mountain ecosystems;

(b) Promoting integrated watershed development and alternative livelihood opportunities. Although each area has its own particular significance, they are often dealt with together in the framework of an integrated ecosystem approach to sustainable mountain development. The section below will briefly discuss progress made under major themes related to chapter 13.

A. Mountains, rural development and food security

4. Mountain communities are among the world's poorest and face a number of difficult development challenges due to specific mountain-related conditions, including limited land resources, marginal agricultural conditions, isolation, and scant equipment and infrastructure. Food insecurity is a serious problem in some mountain regions and a major impediment to achieving other development and conservation objectives. Thus, eliminating poverty and ensuring food security in mountain areas is a high priority of chapter 13.

5. Mountain areas are the origin of a number of important cultivated species that contribute substantially to the world's food basket. They continue to be an important source of genetic resources with good potential for improved agriculture and food production. The linkages between mountain food security and rural development are being approached from various viewpoints that aim to improve agriculture and food production, storage, distribution and exchange. They include exploiting the vast potential of mountain plant and animal resources; improving the management and use of water resources; and organizing the social aspects of mountain communities.

6. Agriculture and food production are expected to benefit significantly from research on biological diversity in mountain areas. Many current efforts to improve the management of water resources for food production are building on a number of traditional technologies and practices. Initiatives to inventory and assess those technologies are being undertaken in many countries. At its sixth session, the Commission covered the issue of water resources, and progress in cooperation and management is likely to take place at the national, regional and international levels.

7. Livestock production and management in mountain areas is also an important contributing factor to food security and rural livelihoods. Many aspects of it were recently explored during the International Symposium on Livestock in the Mountain/Highland Production System (7-10 December 1999, Pokhara, Nepal), organized by the International Centre for Integrated Mountain Development (ICIMOD), the International Livestock Research Institute (ILRI) and FAO. Issues related to the changing patterns of

livestock production are discussed in a background paper prepared by FAO for the Commission.

8. Regarding rural development and economic development in general, mountain communities have been calling for a balance between conservation and development; mountain ecosystems should serve both. In Europe, mountain municipalities, in particular in France, have been adamant about the need to develop and use mountain resources, in particular forests, sustainably. Many EU initiatives have served not only to recognize the importance of traditional local agricultural products but also to protect them and facilitate their distribution. Many developing countries (e.g., Mexico, Bolivia, Nepal, Peru and Yemen) have been active in integrated mountain watershed management and development projects. Some major regional programmes are now contributing to the development of alternative sustainable livelihood systems in mountain watersheds, including work in the Andes carried out by the Consortium for Sustainable Development of the Andean Ecorregion (CONDESAN), the African Highlands Initiative of the International Centre for Research in Agroforestry (ICRAF) and ICIMOD's comprehensive programme for the Hindu Kush/Himalaya region. These consider the whole range of interventions — from natural resource husbandry, the conservation of basic ecological processes, the use of local technologies and overall support to local community development in the framework of national economies.

B. Conservation of biological diversity

9. Mountain areas are known to be important but fragile reservoirs of biological diversity. In the tropics they often contain a greater concentration of genetic resources than lowland forest ecosystems, with typically higher levels of endemic species. The issue of how to conserve and sustainably use these resources in a variety of settings, in both industrialized and developing countries, is a major challenge today. The issues are very different, depending on the context. In some areas, rapid economic development with little concern for environmental impacts, is posing a real threat to biological diversity. Mounting poverty and increasing population growth in some developed and developing countries is creating unsustainable pressure on already endangered plant and animal species. The illegal trade in animals is also having a major impact in some mountain regions and is more difficult to control in rough mountain terrain, where accessibility is often poor.

10. Protected areas play a critical role in the conservation of biological diversity in mountain regions: almost one third of the designated natural World Heritage Sites are protected mountain areas. While protected area management activities in mountainous regions have been reinforced in many countries, establishing parks and protected areas without paying adequate attention to rural development concerns has often led to failure. There is today an increasing number of innovative examples of more integrated approaches to biodiversity conservation, which combine both human development and natural resource conservation and give local populations a stake, economic and otherwise, in sustainably managing biological diversity. The Mountain Protected Area Network of the World Conservation Union (IUCN), together with many international and national non-governmental organizations, has done a great deal to promote and facilitate this approach. The following projects are illustrative:

(a) The joint UNU/UNEP/GEF programme entitled People, Land Management and Environmental Change (PLEC) has developed participatory and sustainable models of *in-situ* agro-biodiversity management, based on small farmers' traditional knowledge. In participation with local farmers, demonstration sites have been established in mountain ecosystems of China, Ghana, Guinea, Jamaica, Kenya, Papua New Guinea, United Republic of Tanzania and Thailand;

(b) The Global Environment Facility (GEF) is currently funding biodiversity conservation projects in mountain areas in some 21 countries. The GEF Transcarpathian Biodiversity Protection Project, in which Poland, Slovakia and Ukraine cooperate, is particularly innovative in approach. It includes the training of staff and the involvement of the local people in sustainable revenue generation through tourism, forestry and hunting. In 1998, it received international recognition as the first trilateral biosphere reserve under UNESCO's Man and the Biosphere (MAB) Programme;

(c) In the Altai mountains of Central Asia a transboundary biosphere reserve is being developed, in response to the 1998 Altai Declaration of Urumqi. It

involves the Altai region of the Russian Federation and of China, and parts of eastern Kazakhstan and Western Mongolia;

(d) A key programme of the Central American Commission on Environment and Development (CCAD) is the Meso-American Biotic Corridor linking protected areas in the mountains of seven countries in the region. Building on this initiative and other mountain corridor projects such as Yellowstone-to-Yukon, the Wildlife Conservation Society, with collaboration from IUCN, has recently begun an ambitious programme of developing a biological corridor of the Americas from Tierra del Fuego to Alaska, along the mountain backbone of the two continents. The corridor will connect the existing series of protected areas;

(e) In the Hindu Kush/Himalaya region ICIMOD is running a project entitled Conservation of Biological Diversity in Mountain Ecosystems, with activities centred on biodiversity assessment, management and applied ethnobotany. ICIMOD and UNEP also jointly developed two models for integrated management of Himalayan ecosystems;

(f) The Mountain Institute (TMI) has been active in community-based biodiversity conservation, including support to programmes in the Himalayas in Nepal, in the Tibet Autonomous Region of China, in India, and in the Andes, centred in Peru and in Ecuador. Also in the Andean region, the International Potato Center (CIP) and UNEP have started an analytical study on *in-situ* conservation of agro-biodiversity;

(g) Efforts to link biodiversity conservation with cultural and spiritual values have resulted in a UNESCO-led initiative, with financial support from the Government of Germany, for a project called Sacred Sites: Cultural Integrity and Biological Diversity.

11. An important global research effort, currently under way, is attempting to carry out a major assessment of mountain biodiversity. The Diversitas Programme and the Swiss Academy of Sciences created a Global Mountain Biodiversity Assessment research network and project in 1999. The assessment is expected to enhance the knowledge base and identify gaps for further research, ultimately contributing to improvements in areas such as food production and pharmaceutical products.

C. Freshwater

12. The importance of mountain regions for a sustainable supply and quality of fresh water has been increasingly recognized as a central issue in recent years. In its 1998 review of strategic approaches for freshwater management, the Commission on Sustainable Development stressed the need for an integrated approach, with emphasis on the social dimension of freshwater management, and identified mountainous regions and other fragile ecosystems as particularly sensitive areas where incentives may be necessary to promote land-use practices appropriate to local conditions in order to protect or rehabilitate freshwater resources. A Swiss-supported publication entitled "Mountains of the world: water towers for the 21st century", prepared for the Commission at its sixth session, provided a number of case studies illustrating various issues and challenges from throughout the world.

13. A number of national and regional initiatives and actions have been taken to join forces and plan the development and conservation of common key mountain ranges and watersheds for water resource development and sharing. In central Asian States the importance of linkages between mountainous areas and dryland areas downstream has been stressed in many cases. Linkages are also very relevant in other areas, such as the Fouta Djallon highlands, where a ministerial conference in West Africa focused on supporting conservation and development efforts in the area's major watersheds, aimed at the protection and sustainable management of water resources for the entire region.

14. An important issue related to fresh water is hydropower production in mountain areas. Large hydropower schemes have become quite controversial. The public is increasingly aware of their potential threat to valuable and unique habitats and of the socio-economic disruption associated with the displacement of local populations. Consequently, with newer hydropower projects, monitoring of their impacts has increased. There is also greater recognition that decentralized, small scheme hydropower production in mountain areas may in some cases be more appropriate than centralized hydropower production in large and more vulnerable power plants. This is particularly true in developing countries and areas with high seismic activity. Hydropower production in mountain areas can

positively influence watershed management since it may lead to increased conservation efforts in the respective watershed, including forest protection or afforestation programmes. It can also have a positive connection with agricultural production through irrigation.

D. Forests

15. The importance of forests and trees in mountain ecosystems has become more evident and received greater attention over the past few years. The Commission's Intergovernmental Forum on Forests at its second and third sessions drew specific attention to mountain forests, in addition to those of other fragile areas, as deserving of special attention, in light of the critical role they play. The media have made the public more aware of the potentially damaging effects of deforestation in mountainous areas, such as the recent disastrous floods in China and other parts of the world. Awareness of the environmental, social and economic roles of mountain forests was heightened by an electronic conference, organized by the Mountain Forum, on "Mountain people, forests and trees". The conference brought together the experiences of mountain people around the world, with the goal of contributing to global knowledge of how mountain forests and trees are important not only for mountain people but also for the many people living in lower-lying regions.

16. Recent efforts to improve understanding and knowledge of tropical "montane" cloud forests, an increasingly threatened mountain ecosystem, have been making headway. The Tropical Montane Cloud Forest Initiative was begun in 1999, in a partnership including IUCN, the World Wildlife Fund (WWF), UNESCO, UNEP, the World Conservation Monitoring Centre (WCMC) and IUCN/Netherlands. Its aim is to focus greater attention on this unique ecosystem and to promote more funding for research and development programmes. The International Hydrological Programme of UNESCO is currently producing a popular document on montane cloud forests in an attempt to create greater public awareness.

17. National forest programmes, as defined by the Intergovernmental Panel on Forests, which met from 1995 to 1997, recognize the importance of considering the specific characteristics and needs of forests in mountains and key watersheds. Synergies between the various frameworks that are related to forestry must be strengthened at the national level to ensure that forestry activities in mountain areas are coherent and that the potential benefits of each activity are maximized. A number of mountainous countries are already engaged in the process of formulating national forest programmes.

18. As part of its series of information brochures on mountain topics, prepared for each session of the Commission since 1997, the Government of Switzerland has prepared a brochure on mountain forests, which will be presented at a side event during the eighth session.

E. Tourism

19. Tourism has become a major issue for mountain areas in both developing and industrialized countries. As pointed out at the nineteenth special session of the General Assembly, tourism is one of the world's largest industries and fastest growing economic sectors. Although the impacts of tourism in mountain areas can be very positive in economic terms, the environmental and social consequences can be very damaging, if not carefully managed. Ecotourism activities are gaining importance in many mountain regions and provide an opportunity for diversification of sources of income and sustainable livelihoods for the mountain population.

20. The General Assembly declared 2002 not only the International Year of Mountains but also the International Year of Ecotourism. During the discussion on tourism by the Commission at its seventh session, delegations noted that there were obvious linkages between the two and that mountain regions represented a significant portion of the tourism industry. "These remote, fragile and highly biodiverse ecosystems are homes to unique cultures and traditions which draw tourists from an increasingly urbanized world."[1]

21. Practical action includes the development of the Ecotourism Management Plan for the Huascaran National Park in Peru, with the assistance of The Mountain Institute. The Institute is also supporting work in Sikkim, India and Nepal on biodiversity conservation through ecotourism, by promoting village enterprises. The Mountain Forum hosted an electronic conference which resulted in a publication entitled

"Community-based mountain tourism: practices for linking conservation and enterprise". The World Mountaineering and Climbing Federation (UIAA) Working Group on Access and Conservation, in cooperation with IUCN, organized a seminar (Barcelona, May 1998) on ways of monitoring, assessing and minimizing the environmental impacts of climbing and mountaineering. The Working Group is currently considering, as a follow-up to the seminar, the issue of maximizing the economic benefits of mountaineering and trekking to mountain communities.

F. Climate change

22. High mountain ecosystems are generally considered particularly sensitive to global warming. They increasingly appear to be useful indicators of climate change effects, which are expected to be more pronounced on alpine vegetation than on vegetation at lower altitudes. Human land use, which could mask climate-related change, is often negligible in high mountain regions. Consequently, there has been a recent increase in mountain research related to climate change and in national attention devoted to this issue. In Switzerland an important element of the climate change discussion relates to the potentially damaging impact that global warming could have on winter tourism. Researchers and decision makers are looking more seriously at the possibility that higher winter temperatures could result in less snowfall at lower elevations, forcing many ski resorts to close down and resulting in huge economic losses and significant employment problems.

23. In the area of research, the "Gloria" programme was recently initiated at the University of Vienna. It is looking at evidence of climate-induced upward-migration of mountain plants. The current proposal calls for a global observation network in high mountain ecosystems. The network would contribute to the implementation of the Mountain Initiative of the International Geosphere/Biosphere Programme (IGBP), which originated with a workshop in Kathmandu in 1996 and was endorsed in 1999. It will involve four of the core projects of IGBP, one of which is the Land-use/cover change core project, being implemented jointly with the International Human Dimensions Programme (IHDP).

G. Culture and traditional knowledge

24. There is new interest in the inventory, assessment, defence and enhancement of the cultural wealth and traditional knowledge of mountain communities. Such activities can be carried out individually by international organizations or included in integrated rural development activities being undertaken in the field. In Yemen, for instance, with support from UNDP and FAO, a major project on managing environmental resources is taking inventory of the knowledge and practices of local communities in the relevant area of water, soil and plant resource conservation. Morocco is developing a number of activities for the cultural and economic development of mountain regions and communities, with emphasis on the cultural dimension. The FAO/Italy global project on participatory upland conservation and development has been very effective in capitalizing on local human resources and their traditional practices. An important FAO-implemented, Dutch-funded regional project in Asia, the Participatory Watershed Management Training in Asia project, has been documenting with interested Governments and putting to practical use the huge wealth of land husbandry and soil conservation practices available in the region. Similar initiatives are being developed elsewhere in Africa, within the ICRAF-led African Highlands Initiative and other initiatives of ILRI, and in Latin America, with CIP/CONDESAN.

25. The cultural heritage of mountain communities is well covered in the activities of the UNESCO World Heritage Convention and also in the framework of the UNESCO MAB project on mountain ecosystems. Initiatives already taken by countries such as Italy, France and Kyrgyzstan for the preparation and observance of the International Year of Mountains are an indication of the importance that the cultural dimension of mountain communities will have for all countries in observing the Year.

H. Research considerations

26. Research efforts undertaken in accordance with chapter 13 have recently begun to receive greater attention. In 1996, the International Union of Forestry Research Organizations (IUFRO) established the Task Force on Forests in Sustainable Mountain Development which is preparing a state-of-knowledge report that is

expected to help orient research and development efforts in the coming years. A IUFRO interdivisional meeting on forest ecosystems and land use in mountainous areas was held in Seoul in September 1998.

27. The second phase of ICRAF's African Highlands Initiative, dealing with research on food security and income generation, is now being implemented in Ethiopia, Kenya, Madagascar, the United Republic of Tanzania and Uganda. It is one of the components of the Global Mountain Initiative of the Consultative Group on International Agricultural Research (CGIAR), a global ecoregional research programme for sustainable agricultural development in mountain areas, led by CIP in Peru. Within its second regional collaborative programme (1999-2002), ICIMOD continues to carry out research on mountain resource management and social organization in the Hindu Kush/Himalaya region and on other internationally relevant mountain issues.

28. The Alpine Observation and Information System (ISPRA), based in Italy, had projects in 1997-1998 involving environmental and socio-economic indicators, communications, information, research systems, data sources, a thesaurus and mapping. The European Commission, within its Environment and Climate Programme, is conducting collaborative research in the Alps and other mountain ranges on the effects of land-use changes on mountain ecosystems and on arctic/alpine ecosystems. Other projects involve the responses of remote mountain lakes and timberlines to environmental change, the effects of climate change on alpine and arctic streams, and desertification in Mediterranean mountains. The Mountain Institute has established a dedicated research and demonstration centre, recently designated a biological field station, at its Spruce Knob Mountain Research Center in West Virginia, United States of America.

III. Progress in the implementation of chapter 13

A. Action at the national and regional levels

29. In implementing chapter 13, one of the most important challenges is how to translate the ideas and concepts of sustainable mountain development into real and concrete action, in particular at the national and subnational levels. The achievement of practical and lasting results on the ground in a way that positively affects mountain inhabitants at the household level will be the main criterion of success.

30. There has been progress in this direction, but the pace and extent of the action has been less than what is needed to meet the challenges effectively and adequately. A noteworthy exception is the case of Mexico, which was one of the first countries to embark on a national planning process to formulate a sustainable mountain development programme. The process, supported through the FAO Technical Cooperation Programme, began in 1997. It encompassed all the elements of a sustainable national mountain programme, including participation of all stakeholders, training and capacity-building at different levels, and development through pilot activities.

31. China has recently devoted increased resources and attention to mountain development and conservation, with significant results on the ground. In 1996 a major three-year national demonstration project on integrated mountain development was launched in 114 counties in 30 provinces throughout China. Project coordination is taking shape with the direct involvement of 11 ministries and the Bank of China. In the Russian Federation, the Institute of Sustainable Mountain Development at the North Caucasus State University, Vladikavkaz, was established to address mountain issues. In 1998 a mountain law was passed there.

32. The experience of the FAO/Italy interregional project for participatory upland conservation and development was first reported on at the third session of the Commission. The project achieved a great deal in terms of its overall contribution to knowledge and understanding of the use of participatory methodologies and an integrated watershed management approach to conservation and development in mountain regions. Its impact has already spread to areas beyond those originally covered. In Burundi, for example, 12 of the country's 16 provinces are currently using participatory planning for integrated watershed management based on the project's original pilot experience, and the approach has been institutionalized in the responsible ministry.

33. In Europe, the FAO/European Forestry Commission Working Party on the Management of

Mountain Watersheds, at its twenty-first session (Marienbad, Czech Republic, 6-11 October 1998) had as its main theme "Integrated watershed management". Also of significance was a series of seminars organized by EUROMONTANA in 1999 (St. Etienne, France; Victoria Gasteiz, Spain; and Cracovia, Poland) on high-value products and sustainable mountain development, which linked mountain associations in 20 countries. A conference is scheduled for March 2000 in Trento, Italy.

34. In Africa, progress has occurred in several areas, including participatory watershed management activities in Morocco through a UNDP/FAO-assisted project and work towards developing a national strategy for the conservation and development of mountain areas. Ongoing efforts in the Fouta Djallon region for integrated upland development and resource management aim to protect the water supply of the West African rivers that flow from the massif. Other activities in conservation and development are being undertaken in central, eastern and southern Africa and in Madagascar. The Rwenzori Mountains conference, organized and hosted by Makerere University (Kampala, Uganda, 1996) was an important African mountain initiative. A mountain resource centre has since been established at Makerere University.

35. In Asia, significant action has taken place in a number of regional processes supported by a strong institutional context. ICIMOD has continued to focus research and development activities in the Hindu Kush/Himalaya region, in addition to the strong support to networking already described above. A noteworthy interdisciplinary watershed management initiative, being carried out in four of ICIMOD's partner countries along a west/east transect through the Himalayas, is the People and Resource Dynamics Project. It is being implemented in areas where there is generally high pressure on natural resources, and it aims, through monitoring and increased understanding of various processes, to develop guidelines for policies and programmes in this field. In Pakistan a new Himal conservation strategy that extends from the summits to the Bangladeshi coast is being implemented with the support of IUCN.

36. The International Board for Soil Research and Management (IBSRAM) is supporting work in Asia leading to the development of methods and concepts focused on urgent land degradation problems, including problems in hilly or mountainous terrain and in particular on the sustainable management of sloping lands. Community forestry and the development of participatory approaches and tools for mountain areas in Asia continues to be facilitated by the work of the Regional Community Forestry Training Centre (RECOFTC), especially through the development of curricula and training materials.

37. In Latin America good progress has been made overall in sustainable mountain development through a variety of regional programmes and projects, supported and assisted by CIP, CONDESAN, FAO and a number of donor and non-governmental organizations. The Andean Mountains Association (AMA) held an important symposium (Quito, Ecuador, December 1998) on sustainable mountain development in the region which brought together researchers, practitioners and donor representatives to discuss a wide variety of issues and help orient future work. The Mexican experience referred to above in national planning for mountain areas is now being shared with other member countries of the FAO-supported Technical Cooperation Network on Watershed Management in Latin America and the Caribbean so as to stimulate and facilitate similar exercises in the region.

38. Although real progress has been achieved since 1997, there is a commonly felt need for more action and further cooperation to carry out mountain development and conservation activities that result in meaningful change at the community and household levels. Although awareness-raising continues to be an important issue, many countries also require capacity-building and technical assistance to ensure that the concepts of chapter 13 are translated into concrete action. Additionally, there remain significant gaps in knowledge and information on the extent to which progress is being made, especially at the country level.

B. Inter-agency mechanisms

39. Inter-agency collaboration and cooperation, a mainstay of activities in support of chapter 13, have continued and remain strong. Two meetings of the Inter-agency Group on Mountains, with participants from both United Nations and non-United Nations organizations, with FAO as coordinator, were held in 1999 (March and October) with the purpose of discussing preparations for the International Year of Mountains. The Group has expanded its membership to

include major actors from sectors that were not initially represented when the Group was first established in 1994. The Group continues to play an important role in steering and advising on implementation of chapter 13 and on the Year. It has forged new and innovative partnerships among non-governmental organizations, intergovernmental organizations and Governments and has consolidated and focused action and attention on areas of strategic importance to chapter 13.

40. FAO, as task manager of chapter 13, and in its recently expanded mandate as lead agency for the International Year,[2] has reactivated the Organization's interdepartmental working group on mountains. The group meets on an ad hoc basis to provide multidisciplinary support in addressing key concerns and issues of mountain development and conservation and ensures that the complete range of FAO expertise and resources relating to food security, poverty alleviation, rural development and natural resource conservation are being fully mobilized in this effort.

C. Major groups: international and regional networking

41. Overall, some of the most significant recent progress in implementing the "mountain agenda", as the issues addressed in chapter 13 are often called, has been in the area of networking and information exchange. The Mountain Forum was established in 1995 and has become the main institutional mechanism for networking on mountains. Its membership has grown to more than 1,300 for the global node alone — i.e., not counting those that are subscribed exclusively to one of the regional nodes. The Forum continues to expand, mainly through a decentralized process by which regional nodes have been established in Asia/Pacific, Latin America, Africa, Europe, and North America. Subregional nodes also exist in several areas. The Forum has promoted greater awareness of critical mountain issues and fostered mutual support for greater action at the local level. Among its services are electronic conferences, discussion lists, an on-line library and documentation centre, membership contact information and an updated calendar of key mountain-related events.

42. At the international level, an important mountain conference, entitled the "World Mountain Forum", will be held in June 2000 in France. The event is meant to provide an opportunity, primarily for representatives of mountain communities throughout the world, to meet and discuss issues of common interest and to establish networking connections for continued exchange.

43. At the regional level, new and innovative mountain networking and collaborative mechanisms are being established, and existing ones are being reinforced. In Latin America the Andean Mountains Association, developed with assistance from UNU, is playing a more active role in mobilizing Andean scholars, educators and researchers to address sustainable mountain development issues. The group organized an important symposium (Quito, Ecuador, December 1998) which included, in addition to the normal membership, a number of representatives from development and conservation organizations working at the field level.

44. In Africa, major issues, needs and activities in mountains and highlands still need to be further documented and publicized. This is happening progressively as governmental and non-governmental initiatives take hold in various mountainous or highland areas, including the Maghreb and the Fouta Djallon region of Africa. The African Mountains Association was established in 1987 with assistance from UNU to look into African perspectives on mountain ecosystems, and it continues actively to pursue and report on African mountain research and development. The most significant recent development in terms of networking and collaboration has been the establishment of the African node of the Mountain Forum at a workshop of key organizations and stakeholders in August 1999. This was the culmination of a long process supported by FAO, UNEP, ILRI and ICRAF. Through an initial agreement, ICRAF will temporarily host the node. Identifying adequate funding to maintain this regional network and gaining a more thorough knowledge and understanding of the institutional landscape of mountain organizations in Africa are key immediate concerns.

45. North America faced a similar situation until recently, when a workshop similar to the one held in Africa was convened at the Banff (Canada) Centre for Mountain Culture in September 1999. It lay the groundwork for a major mountain meeting planned for North America and established a regional Mountain Forum node to serve Canada, the United States and Mexico.

46. In Europe, networking on mountain issues has been quite active over the past few years. The European Mountain Forum, established in 1998, with support from the Government of Switzerland and IUCN, has grown quickly, with a membership of nearly 300 by mid-1999. The network covers mountain ranges throughout Europe, with decentralized local nodes operating in the Carpathians, the Caucasus, the Mediterranean mountains, and the middle mountains of western and central Europe. Until recently, mountain forests were dealt with at the European level mainly through the follow-up process to decisions taken at the European Ministerial Conference for the Protection of Forests in Europe. That process is now led by the European Observatory on Mountain Forests (EOMF), in collaboration with FAO and IUFRO.

47. Mountain networking in Asia is channelled mainly through the Asia/Pacific Mountain Network (APMN), which has been operating since early 1995 and has nearly 400 registered members. Its secretariat is based at ICIMOD, Kathmandu, Nepal. APMN has organized several regional consultations, conferences and meetings on sustainable mountain development. It has several networking and information-sharing activities, such as a home page, an electronic discussion list, and a biannual newsletter. It will be organizing its first regional electronic conference shortly and has started a small grants programme to facilitate capacity-building on networking and information-sharing in the region. In Central Asia, it is also supporting a networking capacity-building initiative for sustainable mountain development in the newly independent Central Asian Republics. In the Russian Federation the UNESCO-sponsored MAB-6 programme has continued to assist in the area of networking and information exchange; the *Eurasia Mountain Newsletter* was launched in Russian with a distribution to some 200 members.

D. Funding and financial mechanisms

48. Investment in the sustainable development of mountain areas is still inadequate, in terms both of domestic public spending and official development assistance (ODA). Funding through global and regional mechanisms such as the Global Environment Facility and the regional development banks needs to be mobilized in ways that address more directly the specific needs and concerns of mountain regions rather than through more traditional funding approaches that simply include mountain areas among others in national development initiatives. There is also a need to look at the potential of using more innovative mechanisms such as debt-for-nature swaps, which have already proved to be very useful and practical.

49. Financial mechanisms and incentives are attracting increased attention. The problem of inequities between highland and lowland regions has been discussed in many of the consultations held during the reporting period. In fact, funding for mountain development and conservation is needed not only at the global, regional and national levels; it is particularly important at the community level in support of activities aimed at the conservation of watersheds, the funding of infrastructure to facilitate access and communications between communities, and general rural development in local communities.

E. International Year of Mountains

50. Since 1997 one of the most significant political decisions regarding mountains has been General Assembly resolution 53/24 of 10 November 1998, in which 2002 was declared the International Year of Mountains. This decision has placed the core issues of chapter 13 in an even brighter international spotlight and provides an unparalleled opportunity to implement sustainable mountain development on a practical and concrete level which effectively reaches mountain households. The Assembly invited FAO to serve as lead agency of the Year, in collaboration with Governments, UNEP, UNDP, UNESCO and other relevant organizations of the United Nations system. It also encouraged all Governments, the United Nations system and other actors to take advantage of the Year to increase awareness of the importance of sustainable mountain development. It further called upon all three entities as well as the private sector to make voluntary contributions in support of the Year. A report of the Secretary-General on the state of preparations for the Year is to be submitted to the Assembly at its fifty-fifth session.

51. Preparations for the observance of the Year began shortly after the resolution was adopted, when FAO convened the fifth meeting of the ad hoc Inter-Agency Group on Mountains to brainstorm on activities to be envisaged during the Year. The meeting was attended by 13 international governmental and non-

governmental organizations and by permanent representatives of FAO member Governments and many observers. It produced a wealth of ideas and programme elements which will be incorporated into the preparatory process for the Year. Since funding from international agencies is not expected to be sufficient to cover the needs for the Year, it was suggested that a combination of international public funding, bilateral and multilateral funding and private interventions and initiatives be adopted. It was agreed that a concept paper should be prepared to clarify the overall strategy, approach and substance of the programme.

52. A draft concept paper was subsequently prepared by FAO and was discussed at the sixth meeting of the Inter-Agency Group (Cusco, Peru, 2 October 1999). The framework for the Year is based on chapter 13 of Agenda 21, the objectives and the institutional, thematic and managerial structures, as well as the core activities and fund-raising needs, are set forth in the draft concept paper. The FAO-managed core programme for the Year has been estimated to require extrabudgetary funding on the order of US$ 5 million. The need to enlist donor governmental support has been emphasized.

IV. Emerging issues and priorities for further action

A. Conflict

53. Especially in recent times, mountain areas are increasingly the site of social conflict, ethnic strife and war, resulting from a combination of very complex issues. Conflict in mountain areas can be caused by diverse factors such as poverty, ethnic tension, competition for scarce resources and even the geographical isolation of mountain areas which makes them likely refuges for armed opposition groups. Efforts to carry out conservation and sustainable development initiatives are often stymied by these realities. The issue of security and conflict resolution is very relevant to efforts to achieve sustainable approaches to mountain development and conservation. The International Year of Mountains provides a strong platform for addressing this issue, since promoting international peace was one of the original ideas behind the observance of international years.

B. Highland/lowland interaction

54. Mountain areas are open systems which intensively interact with their surrounding regions. Awareness of the importance and complexity of highland/lowland linkages is significantly increasing. These interactions are multifaceted, involving not only ecological considerations but economic, social and political ones as well. In recent years important experience has been gained in terms of the ecological dimension of these linkages, but little attention has yet been given to the other aspects. Considerable effort is required to increase the knowledge and experience about these linkages, leading to more secure rights and opportunities for the different stakeholders in a watershed, better support to watershed management groups at different geographical scales and the formulation of integrated watershed management policies.

C. Policy and law

55. To support and foster action towards sustainable mountain development at the local level, adequate legal and policy mechanisms need to be developed, in particular at the national level. Although many countries have laws and policies that affect their mountain areas, to date, relatively few countries have enacted comprehensive national mountain policies or laws which directly address the special conditions and problems of mountain regions and those who inhabit them. At the national level, there is a need for legal and policy frameworks that recognize local property rights, apply full-cost pricing for mountain goods and services, offer adequate protection to fragile ecosystems and sacred sites, protect traditional knowledge through intellectual property rights etc. At the international and regional levels, stronger legal instruments are needed to ensure transboundary cooperation, thus leading to better human development and ecosystem conservation in areas that straddle political borders. Regional policy frameworks are also important in this respect and need to be further developed in the wake of the regional intergovernmental consultations that have been held in most regions since the United Nations Conference on Environment and Development.

D. Planning and management at the national and local levels

56. Many initiatives have been taken since the United Nations Conference on Environment and Development relating to mountain development for the benefit of local communities. However, one of the most urgent and daunting challenges is to increase conservation activities and encourage framework planning of watershed management and mountain development at the national and local levels. It is important in the period to come to effect more systematic programme formulation of mountain development, which will lead to the elaboration of local mountain community development programmes within participatory and decentralized approaches.

E. Natural hazards and risks

57. Natural hazards in mountain areas such as floods, landslides, avalanches and volcanic eruptions have received greater attention in recent years and may have been exacerbated by the El Niño/Southern Oscillation (ENSO) phenomenon. The degree to which human activities are influencing such hazards is very much debated. However, it is clear that the vulnerability of mountain communities to hazards has increased in industrialized countries — mainly due to increased infrastructure development — and in developing countries — due to population pressure and the expansion of activities into hazard-prone areas. Significant challenges lie ahead in terms of increasing knowledge about mountain hazards and of improved risk management.

F. Funding

58. As noted above, a major challenge to the successful implementation of chapter 13 is the mobilization of adequate funding. A much broader base of bilateral, multilateral and private-sector funding and financing than has so far existed is required in order to respond to the needs of mountain regions and their inhabitants. More concerted efforts at the national level could also provide additional resources. To date, a small number of donor organizations and countries have carried most of the financial burden of mountain development assistance. The International Year of Mountains provides an opportunity to mobilize the resources, both human and financial, on a sustained level, that are needed effectively to implement sustainable mountain development and conservation.

Notes

[1] See *Official Records of the Economic and Social Council, 1999, Supplement No. 9* (E/1999/29), chap. I, sect. C, decision 7/3, annex, para. 10.

[2] General Assembly resolution 53/24 of 10 November 1998, para. 2.